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A D D R E S S

DELIVERED BEFORE

THE FRANKLIN INSTITUTE

OF THE

State of Pennsylvania,

FOR THE PROMOTION OF THE MECHANIC ARTS,

AT THE CLOSE OF THEIR

Eighteenth Exhibition of American Manufactures.

✓
BY HON. JOSEPH R. INGERSOLL.

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ADDRESS.

No department of useful improvement can be expected to prosper without public encouragement. The tardy progress of unassisted individual industry and skill, however well directed and unwearied, can with difficulty withstand surrounding rivalry, even when it has been fortunate enough to force itself into neighbouring notice and to excite limited and occasional reward. Of all the branches of mechanic art, there is scarcely one, some of whose developments have not sprung from comparative obscurity. Practical workings among elemental matter, by hands that do the humblest offices of preparation, suggest facilities which could scarcely occur to the theorist, however intelligent. The eye beholding a finished performance, well adjusted in all its parts, sees nothing of the painful and prolonged exertions, the minute and almost insensible degrees by which the result has been attained. Yet these are rich sources of combination and analysis, and combination and analysis are the only additions which genius and experience can contribute to the voluntary and liberal productions which are scattered abroad by nature with a generous hand.

Pecuniary returns are necessary objects of mechanical pursuit. But they are not the only or the principal inducements to honest industry. In its cherished prospect shines the clear light of Fame; and many an obscure intellect is brightened into glorious capacity by reflections from the enduring names of Watt and Arkwright and Fulton, once humble as its own, but now belonging to the acknowledged benefactors of mankind. Associations such as this can alone furnish opportunities for early distinction. They combine intelligence, experience, scientific knowledge, practical skill, and (haply) wealth. They draw forth from obscurity native merit and bring it into comparison with merit of its kind. If it bear the touchstone and prove of current worth, they cheer it on to redoubled energy, and leave it only when, secure in the possession of inherent and acquired strength, it can defy the bickerings of disappointed envy, and triumph in approved success.

These are in a word the objects of an Institution which in asking attention to every thing around us, performs a leading duty of its organization, and invites by a direct appeal to the senses, assistance from a well judging community. This is its proud display, its accomplishment—which yearly crowns a long career of modest and retiring efforts. Meetings monthly held with access to two thousand members, for mutual improvement; a library of gradual but certain growth; cabinets of objects for instruction; lectures connected with the Mechanic arts, natural Philosophy, and Chemistry, open not only to immediate members, but to alumni of distinguished seminaries, the University of Pennsylvania and the High School of Philadelphia; and a monthly journal replete with varied matter to instruct and guide, now attaining its 275th number; these are preliminaries to an annual exhibition, the Eighteenth being now before us in all its admirable arrangement and teeming usefulness.

The Franklin Institute, if not the earliest association for the popular diffusion of science in its application to Mechanism, was the first to establish these periodical exhibitions of American Manufactures. An example so full of advantages to the mechanical community, has long been followed in the populous and older cities of the Atlantic border. It has now spread far into the interior. The city of Chicago, numbering twenty thousand inhabitants, after an existence as a town of some sixteen years, is about to make its second effort of a similar character. Were the practice which is so well established possessed of no other claims to merit, it would serve to collect and record from year to year authentic proofs of the progress of improvement. Of our own it may be said, that each succeeding effort, in some respects, outruns its predecessor; and each new increase in novelty and advancement, is greater, in comparison than the last. The practice serves, besides, to invite public attention; to stir up languid interest; to show what is possible by producing what is done; to stimulate exertion; to reward enterprise and industry; to prevent error; to fix a just estimate on the manifold productions of mechanic skill and bring it into notice; and to unfold the principles and the power of labor.

In the present display, there is distinguished merit. Particular excellences have been officially announced and will be duly appreciated. On an occasion when much is presented in individual branches for applause, a casual observer might be struck with the absence of others in which our manufacturers are known to excel. It is matter not less worthy of remark, that these spacious halls would readily accommodate far more numerous specimens of skill than are now contributed. A temporary building, erected for a similar exhibition in Paris in the *Champs Elysées*, has received the offerings of more than four thousand manufacturers. Perhaps patriotic artizans among us are disposed to impute to the public a lack of interest in the labors of the Institute. If a small proportion of the spirit which distinguishes any one of those sources which have been enumerated of its vital existence, those ingredients of a consistent and harmonious union, were manifested on each returning anniversary by a general indulgence of laudable and pleasing curiosity, the regret lately expressed by a distinguished foreigner, now happily identified with the science of the country, might soon cease to have support. He

was surprised to find the total want of extensive Museums amongst us : those mute but expressive and eloquent teachers of otherwise inscrutable lessons of philosophy. Let public liberality contribute what would supply this valuable addition to the machinery wielded for public good by the Franklin Institute, and infinite zest will be infused into the ardor with which its immediate laborers are already animated.

There is no species of talent, no form of available and meritorious exertion, that is not at some stage of advancement, confirmed in its hopes and strengthened in its assurance by the favor of an enlightened public. Of all descriptions of merit, none more clearly exhibits or more honestly deserves whatever encouragement it can receive, than that which is founded in mechanic skill. Its exercises and illustrations are altogether so practical, that there is scarcely room for deception in theory. The use and application are so general, and so familiar to every one, that it is almost impossible that any one should be misled by what in other branches of employment would be called empiricism or quackery. If error chance to find its way into a single quarter, truth with its disinfecting properties is distributed among a thousand and a thousand hands. Whatever sagacity may lie at the root of mechanic skill, how patient soever may have been the exertions by which it has arrived at excellence, it is for the most part applied to the ordinary purposes of life, is transparent in its exercise, and places infallible tests of failure or success within the reach of the commonest observation. When philosophy shall have done all it can for mechanism, it will find itself repaid by the moral lesson taught in return by mechanism, that power acting directly and without circumvention will produce the greatest effect. Different reasons concur in giving truth and importance to these suggestions among ourselves. No separate class exists among us aloof from the necessities of some description of toil, and from direct personal acquaintance with the fruits of industry. It has been the pride too of our countrymen to give practical efficacy not only to their own inventions, but to those of foreign birth, which coming into sickly and abortive life elsewhere, have remained for the want of a keener perception and more practical adroitness, objects of unprofitable labor or curious speculation, until both of the requisite deficiencies have been supplied. Possibly a more minute subdivision of labor, which has its unquestioned advantages abroad, may contribute to this result. Of the fact itself, one or two well known instances will suffice for proof. Our people are in the habit of turning their hands to any thing. Pioneers of the forest, the same axe wielded by the same arm fells the first tree, fashions the log into a wooden wall, cuts the tree into a boat, shapes the bean pole, and battles with the savage. Steam engines were long usefully employed for certain purposes in England. Captain Thomas Savery building upon still earlier discoveries, and especially those of Brancas, a modern Roman philosopher, obtained a patent for his invention in 1698, and it was applied to pumping water out of the Cornish mines and raising from them the ore. Newcomen improved the machinery in 1705; and Beighton simplified its movements in 1717. There it stood for half a century, when James Watt, a Scotchman, added great improvements, and it was brought, as is known to every body, into extensive use in mining, as

well as for working in mechanical and manufacturing utility. But the effectual application of it to navigation was reserved for a Lancaster county mechanic. We have seen too the progress of the Magnetic Telegraph. Not its progress through space, for that defies the optics of thought itself, outstrips in rapidity the chariot of the sun, reaches a western destination while the hand of the dial goes backward without a miracle, performs its gigantic journeys according to every known means of computation in less than no time, and now, mainly by the experiments of one of the most accomplished associates of the Franklin Institute, ascertains the longitude with almost unerring precision. By its wonderful influence, results of the recent election from various places, all of them hundreds of miles distant, were known in Philadelphia at an earlier moment than similar intelligence from the polls in the heart of the city. The progress of the discovery as a practical thing is the circumstance most worthy of notice. One of the Journals of the day quotes from Arthur Young's travels in France from 1787 to 1789 the description of "a remarkable discovery in electricity by M. Lomond." Wires connecting two cylindrical cases and electrometers, in apartments distant from each other, communicated signs or corresponding motions of a pith ball, from which the words were written down which they indicated; thus showing an alphabet of motions. The length of wires, it is added, makes no difference in the effect: "a correspondence might be carried on, at any distance; within or without a besieged town for instance; or for a purpose much more worthy and a thousand times more harmless between two towns prohibited or prevented from any better connexion." More than sixty years have elapsed since this imperfect instrument was made and thus described. But yesterday, its development has become the wonder of the world. What proportion of its adaptation to useful purposes belongs to ourselves especially, it is not necessary to ascertain. Much perhaps may be claimed by different intellects. European intelligence certainly laid a broad basis in the science of electro magnetism nearly thirty years ago, and in the subsequent discovery of the electro magnet. The use of an attractive power to write in legible characters is asserted to be an invention of our own. What will scepticism say in palliation of a doubt of the omnipresence of Deity when it finds that mortal enginery can vibrate responsive thought no matter how remote with a delay from its conception only sufficient to give it utterance? Distance increased in Arithmetical proportion is more than counteracted by additions to the series of galvanic pairs of plates which augment the magnetic power in geometric ratio.

The two inventions—the development of latent heat, which produced the steam engine, the modern lever of mechanical power, and especially of navigation by water and transportation by land,—and the development of galvanism, which produced the magnetic telegraph—seem to have been designed mainly for our country. A population spread over an immense extent, and migratory in habit and tendency, is enabled to hold immediate intercourse in one shape from the remotest distances, and personally to visit and become familiarly acquainted through the length and breadth of the land without loss of time, material expense or fatigue. The downward currents of impetuous rivers, that have no re-

tiring ebb for thousands of miles, are stemmed and ascended with a certainty and speed, not to be commanded by other agencies, even on the surface of unresisting waters. A key to the great West, unlocks its mineral and agricultural stores, which in the absence of it, had remained for most purposes impenetrable mysteries. A new world expands in wealth and wisdom, over regions newly redeemed from the hunter and his game, and shares with more advanced civilization in distant regions, its own exhaustless and invaluable resources. In other countries, the propelling power of steam is indeed of value, scarcely to be estimated,—here, it is indispensable. Every spot in the fertile valleys of the West, beckons its approach. Varieties of climate and soil are no longer the peculiarities of remote positions, but are brought together for the common good, as productions of the same parallels of latitude. Majestic distances are annihilated, or serve only to encourage moral elevation, without dividing local interests or preventing social and political harmony. Every additional step in the march of improvement, serves to render more obvious these peculiar advantages. The city of Chicago, at the extremity of Lake Michigan, is reached by the usual lake route from this place, in a journey of 1567 miles in six days. Works now in progress, the “Pennsylvania railroad,” and the “Ohio and Pennsylvania railroad,” will reduce the distance to 860 miles, or nearly one half, and will strike out more than half the time.

Other illustrations will be found scarcely less remarkable than those which have been adverted to. The tardy process of diffusing knowledge by copying manuscripts, was superseded centuries ago by the art of printing, which even in its imperfect state, was not inferior in importance to any discovery ever made. A press now in regular service at Leonardstown, Maryland, has been it seems in almost constant use for more than a hundred years. What resemblance in performance do these antiquated efforts bear to that rotary form of printing press, which is declared “to have produced on a trial experiment, twenty thousand copies per hour?” Anodynes have been used, at least from the days of Paracelsus, and probably as long as medicine has been a science. If relief from bodily suffering be the great secret of the healing art, how can mankind sufficiently appreciate for surgical and other purposes, the modern discovery of the inhalation of ether? We are told that it has circulated through the civilized world with greater rapidity than any other improvement of the day. (Patent office report.) And thus far we are assured upon the same authority, “the entire merit of originality and priority belongs to our countrymen”

An increasing desire to improve upon what we already enjoy—immediate and visible marks of the influences of improvement on an extensive theatre—and above all, substantial benefits derived from the practical character of our improvements—these are among the causes which will make our country the home of the mechanic arts. The realms to be occupied, and the work to be performed are disproportioned to the numbers who are to subdue the one, and to execute the other, according to ordinary rules of political economy. You overcome the difficulty by making a single machine perform the labor of five hundred hands. Undertakings, however great, cease to be formidable when

your means are as gigantic as your object: boldly to attempt, seems alone necessary triumphantly to overcome. Adaptations in many respects belonging to ourselves, are in unison with inherent principles of art. Mechanism is the joint offspring of science and simple labor. We are proud enough to aim at the one, and not too proud to stoop to the other. Mighty efforts of genius have been employed in suggesting the elements, and determining the rules which must govern its operation, while the mere docile hand of willing industry can put into practice the operations which are the fruits of them.

Having traced the commonest instruments of mechanic industry, from the uneducated, whose hands have given the last touch to the suggestions of brighter or more accomplished intelligences, back to those intelligences themselves, we shall have made but a portion of our journey in pursuit of truth. Beyond the proudest human intellects will be found a wiser and a holier teacher. Nature, the immediate offspring of the Parent of all good, instructs and teaches *them*. When a seaman finding a bale of goods too heavy for his strength, calls in the help of his familiar tackle, and then raises it with ease, he avails himself unconsciously of the philosophy of Vitruvius, who merely solved the problem of the agency of one of the half a dozen fundamental mechanical powers, which nature had under a different name, placed in his hands. She is the prolific source of all inventions. Reject her precepts, and genius and industry labor in vain. The quadrature of the circle, and the philosopher's stone, will probably be discovered only with the elixir of life: because they are all at variance with her essential laws; and perpetual motion must reconcile impossibilities, and reverse decrees as settled as the foundations of the earth, or it will remain an ignorant and abortive dream. Nature is as kind in her broad hints against working in the dark, as in pointing out true paths. Perhaps the pursuit of ingenuity, for example, in improving pneumatic engines, or those in which air is the agent of motion, might be diverted into more profitable channels, by the certainty that heat applied to the expansion of any gas, furnishes but a minimum of the power to be derived from similar applications to water or other liquids.

We talk of the pride of science. But science manifests wisdom and foreshadows success, when it assumes its humblest attitudes. To learn that we are unlearned, to see and appreciate the great extent of power that surrounds us, to feel how much of it is unattainable, and in humble hope to try to reach the lowest limits of its lofty sphere, and make a little segment of it our own, are genuine marks of merit, and just aspirations of devout ambition. Science is nothing more nor less than a knowledge of the works of nature, and the mode of making some of them available to purposes of human life. A development of her seeming mysteries is the utmost aim and end of scientific investigations the most profound. Philosophy in its abstruse and successful labors, can at last only hope to become acquainted with, and set in motion, the operation of her simple laws. The earliest and the latest lesson in the ample book of science, is inscribed by the finger of Nature. Her merest elements are full of wisdom: her sublimest efforts are not without simplicity. The inspiration of the brightest intellects, has been traced to what may be re-

garded as some of the most humble of her agencies. If a swallow's nest taught, according to the ancient architect, the art of thatching roofs with sprigs and loam ; if a stagnant pool furnished philosophy with the element of artificial light ; if the wet string of a kite unfolded the phenomena of electricity ; and if fruit falling from the tree demonstrated the agency which keeps in place and motion the universe,—what undiscovered secret may not yet reward a watchful scrutiny of Nature's familiar works ? If minds partaking so largely of celestial mould were *thus* inspired, more limited intelligences may be content to bow their heads, and derive instruction from the same unerring source. Words wiser than the examples of philosophy refer us, if we would be also wise, to the lowly example of the humblest creeping thing, that having "no guide, governor or ruler," "prepareth her meat in the summer, and gathereth her food in harvest." Yet wisdom when even thus humbly taught, as we learn from the same inspired teacher, is "more precious than pearls : all things that thou canst desire are not to be compared to it,"—for "by wisdom is laid the foundation of the earth."

The pride of philosophy must be contented to stoop still lower. Nature herself, pure and uncontaminated, is in the eye of reason, always exalted even in her humility. Her immediate instinctive agencies, deriving wisdom unmixed from its divine fountain, are only one degree less exalted than herself, in their vicarious character. Other sources of instruction must be sought, which having neither the originality of inanimate objects, nor the promptings of unsophisticated instinct, happen to enjoy opportunities and experience, better than those of the philosopher in his schools. The ways of plodding industry in its humblest employments, must occasionally be trodden by those who are at home on the summit of the hill of science. The hand must be able and accustomed to perform some of the menial offices of philosophy, that its minutest details may be understood, and that examples may be set which none may fear to imitate. It was a wise rule of Turkish despotism, that the sovereign should spend a portion of every day in some mechanical employment. Mahomet IV. was deposed because he refused to conform to this salutary rule. We learn from authority so good as that of Sir George Staunton, that the Emperor of China once every year directed the plough through a piece of ground, dressed as a husbandman, to reconcile the farmer to his occupation. Charlemagne ordered that his children should be instructed in some profession. The Emperor Augustus is said to have worn no clothes but such as were made by the empress or her daughters : and Olympia, the mother of Alexander the Great, performed the same office for her warlike son. Is it a fanciful suggestion of the author of a book of much interest, which traces the dignity of mechanical employments beyond the flood ? He insists that Adam was a gardener, Abel a shepherd, Seth a weaver, Enoch a tailor, and Noah, (undoubtedly !) a shipwright. There may be situations in the life of any man, when the might of learning may become of little comparative use, and when the hand being turned to its primitive employments, becomes the master instead of, and in preference to, the head. Who does not admire among the brilliant accomplishments of some of his charming female friends, their skill and frequent exercise in the use of the

needle ; a purely mechanical employment, and which of those charming friends is without a greater or less degree of excellence, in a faculty which she shares with the humblest of her domestics ?

Our researches will sometimes discover a high degree of mechanical taste and aptitude for performance in unexpected quarters. It would scarcely occur to those who are familiar with the productions of exquisite and luxurious refinement in manual art, to seek for instructors in the heart of Southern America, and there among the children of primitive simplicity. Yet they would not look for it among them in vain. The Indians of Peru, occupying the Sierra, which includes the valleys between the Cordilleras and the Andes—the Serranos as they are called—are said, by the latest travelers, to have attained a high degree of perfection in handicraft employments. As goldsmiths, according to the work of Von Tschudi, they are remarkably skilful, and in this branch of industry they produce work, which, for taste and exquisite finish, cannot be excelled in the capitals of Europe. Various kinds of vessels and figures of silver wire—filigranos is the name they bear—made by the Cholos in Ayacucho, have always been favorite articles of ornament in Spain. The Indians of Jauja are very skilful in working iron. Of leather also, they make various things in beautiful style. A circumstance, not inappropriate here, is quoted by the learned biographer of Nathaniel Bowditch, (whose father, it may be remarked, was a ship master turned into a cooper,) from Baron Zach's "*Correspondance Astronomique*." The Baron, with all the world, went to visit Mr. Crowninshield's splendid packet, the "Cleopatra's Barge," on her arrival at Genoa, in 1817. On learning from the Captain's son, a pupil of Bowditch, how little was the error, in their reckoning, in making the Straits of Gibraltar, he inquired how they got their longitude so accurately. The answer was, "First by our chronometers, and afterwards by lunar distances." The Baron expressed surprise, and somewhat unkindly observed, "Do you know how to take and calculate the longitude by lunar distances?" The young navigator replied, "Why our *cook* can do that ; there he is," pointing with his finger to a negro at the stern of the ship, with a white apron before him, and holding a chicken in one hand, and a butcher's knife in the other. "Come forward, Jack," said the Captain, "the gentleman is surprised that you can calculate the longitude ; answer his questions." The Baron asked him what method he used to calculate the longitude by lunar distances? His answer was, "It's all one to me : I use the methods of Maskelyne, Lyons, Mitchell and Bowditch ; but, upon the whole, I prefer Dunthorne's ; I am more used to it, and can work with it quicker." The foreign astronomer declares that he saw all this negro's calculations of the latitude, the longitude, and the true time, which he had worked out on the passage ; and that all his questions were answered by him with wonderful accuracy, not in the Latin of the Caboose, but in good set terms of navigation.

Connected, if not identified, with the principle of humbleness, which is another word for conviction that knowledge does not disdain the lowliest bed, is the principle of docility. Innate parts are obviously unequal. Whatever may be the cause, it is impossible to doubt that

inequalities exist among untutored human intellects, and in the facilities of acquiring instruction. *One* may receive the electric spark of wisdom, while *another* gropes his way tediously through dark and gloomy paths in pursuit of her celestial light. But all must be content to learn. Inspiration, in its literal sense, belongs to none. With this quality in the learner, a desire to know, and willingness to be taught, it is not too much to say, that a due degree of valuable acquisition may with certainty be made. Nature not only opens her store-house of instruction to universal use, and places the key in the hand of every one who earnestly desires to possess it, but she facilitates the accomplishment of her generous purposes, by applying her suggestions to use, and sustaining them with resources adapted to local wants and capacities. Who can doubt the destiny of our own commonwealth and the duty of her sons? Her stones are iron. Her soil teems with subterranean fuel, bursting the solid entrails of the earth, along with the strongest, hardest, most abundant, and most useful of metals, and rendering it as malleable and far more valuable than the Ophir gold. Together they are the great means of manufacturing industry. They utter from the ground a voice, which nothing but wilful error can misinterpret, more prophetic and persuasive than an oracle. Let the rich jewel sparkle in the royal diadem that loads the brow of the monarch of its native soil. We will neither envy its possessor, nor desire to exchange for it our less brilliant productions. A single diamond found in Brazil, estimated at £224,000 sterling, graced the crown of Portugal. More than three hundred and seventy diamonds are said to belong to the British crown, supposed altogether to be worth £111,600. One ton of iron, wrought into the mechanic uses, which many a specimen about us modestly exhibits, has, in our eyes, a worth, intrinsic and extrinsic too, which surpasses that of all the diamonds ever mined. It makes both spears and pruning hooks; is the material alike of the sword and the ploughshare. Its moral uses are still more exalted. It cultivates a spirit of honest industry, rewards the hard hand of labor, stimulates ingenuity, promotes national independence, advances the progress of useful knowledge, gives comfort and convenience to society, and zest and safety to the enjoyments of life, and above all, stamps the character of the age as one of solid substantial merit, above and beyond all that former times, in their wildest fancies, hoped for or conceived. What strange perverseness seized the ancient poets when they placed the iron age last and lowest in the catalogue of time! Silver and gold are in truth the inferior metals to every useful purpose. One of the best of the ancient classics doubted whether the gods might not have denied them in mercy to mankind. Iron is the metal of sound philosophy, universal science, and advanced civilization. Apollo never would have given Midas asses' ears if he had wished by his touch to turn every thing into iron instead of gold. The primitive inhabitants of Brazil used fish-hooks of gold, merely because they thought they could do no better: and they abandoned the practice when they found that the right material abounded in their soil.

Of all the varieties of the Carbon family (to which the diamond belongs,) the diamond is intrinsically the least useful. It derives its

charm only from its scarcity. It will not even burn, but with great persuasion, while its brethren of the coal tribe perform their duties with alacrity. The little piece of plumbago at the end of a scarcely larger piece of stick which form together an ordinary lead pencil, is a twin brother of the diamond. In describing a scientific memorandum or friendly suggestion, it performs an office quite as interesting as that of its more admired relative. We sometimes hear, in praise of the writings of authors of genius, that they are as brilliant as if they were written with a diamond. As it was said of the words of Rousseau, that they were so warm as to burn the very paper on which he wrote. The pencil in daily use, the point of which is scandalized by the universal name of black lead, has nothing of lead about it, but is in reality the same generic substance as the gem of royalty. Half a dozen philosophers, we are told, can make the world believe any thing: and unhappily when they have once created error, it is not without time and effort that it can be dispelled.

Preferring our own productions to what the world is pleased to call the precious metals, and precious stones, let us derive consolation from what we have. Coal is the agent of mechanism, iron the material on which it operates, and steam the power by which its effects are produced.

One is struck with the application of some of these endowments to purposes for which at a former period they scarcely seemed designed. In constructing boats to float upon the water, lightness of the material was deemed a necessary ingredient. Specific gravity is proved to be no longer worthy of consideration if buoyancy be attained. Ponderous substances are as capable of performing the other offices of timber and at the same time of withstanding perils by which vessels of timber would be speedily destroyed. When a small detachment under the auspices of the navy department recently visited the Dead Sea and sounded those asphaltine depths which continue to involve the impenetrable mysteries of the guilty cities of the plain, they carried with them from the shores of the Mediterranean two metal boats, one of copper, which was mistaken by the natives for gold, and one of iron; and they purchased the only wooden one that was to be found on the sea of Galilee. In descending something like a thousand feet of cataract along the almost sanctified waters of the Jordan, their timber bark was shattered. Those of metal defied and triumphed over opposing precipices, and proudly bore the banner of their country on and through the dangers of the river, until it floated in melancholy grandeur on the surface of that sea, whose doomed waters sustain no life within their bosom. Thence the little boats were conveyed in safety back to the government ship to which they belonged, not materially injured by the hardships they had undergone.

A becoming modesty has been commended to the votaries of science of every class; but abatement is not therefore needed of proper self-respect. The two properties are compatible and of mutual advantage. Modesty is the crown of merit, and merit is in most instances the fruit of modesty. A sense of present deficiency prompts to exertion in order that it may be supplied, while toilsome acquisition satisfies us how much

we owe to labor, and how humble would be our pretensions stripped of what we have acquired. Cultivated merit can scarcely fail to aspire to distinction, which is its incentive to exertion. Nature in prompting to honorable efforts and placing within reach the means of improvement and assurances of accomplishment, exacts in turn a faithful, steady and zealous performance of every thing that is necessary to develop her resources, and thus to manifest our gratitude and to deserve success. In far better language than our own,

“ Spirits are not finely touched,
But to fine issues ; nor nature never lends
The smallest scruple of her excellence,
But like a thrifty goddess, she determines
Herself, the glory of a creditor,
Both thanks and use.”

Yet another faculty of fitness to surrounding objects is requisite, in order to give full effect to improvement. It was not enough that whole empires should be penetrated by navigable waters, and that means should be at hand to ascend their impetuous floods. It was not enough that metallic ores should abound, coupled with mineral agencies to give them shape. All the riches of a luxuriant soil would rest in unprofitable inactivity, and all the means for diffusing them in transformed and practicable existence over a smiling land, would stagnate in repose, if *men*, with suitable tempers and tendencies, did not present themselves, to fashion and apply them. The faculty of matter is nothing without the faculty of mind. Willing hands must dig up the shapeless ore, and ingenious and active minds must metamorphose it into the material of mechanism, and then mould it into its thousand instruments, and with those instruments create the thousand fabrics for the perpetually increasing demands of civilized life. The works of nature expand and multiply with the wants of society and the ingenuity of mankind. Look around you, and behold them in almost infinite variety of elegance and character and use.—Say, if you can, which of them all in its present state of beauty and apparent and approaching perfection, does not owe its finished condition to the pure elements bestowed by Providence, either as ingredients and component parts, or as necessary tools and instruments in accomplishing the results,—combined with human skill and industry. This is the whole secret of mechanic art. Nothing is available without a combination, which indicates that the two things were made for each other, and that each must be kept in vigorous and active exercise together.

Fortunately enterprise is the distinguishing property of our countrymen. The indulgence of it is as diversified as the faculties or the desires of men. Some pursue the game of the great deep, and bring home from the bosom of distant seas their hard earned spoils. Others seek the forest, and delight to act the pioneers to civilization among the perils of Indian warfare and uncultivated wilds. Many hold the plough, and enjoy the luxuries of agriculture. Not a few chain their adventurous spirits to the anvil, the lathe, the crucible, the furnace and the loom, and breathe an atmosphere of labor, surrounded by almost untasted refinements that are supposed to belong especially to city life. But all are active, and numbers are keenly alive to the resources within

their reach. More anxious and active spirits probably breathe here than in any other part of the world. Restless and almost countless numbers vie with each other in struggles for distinction in some new discovery or untried exploit. A disposition so marked as belonging to ourselves, would seem to be derived from the adventurous character of that bold mariner who dared to explore distant seas, and brought European experience and civilization to these unknown shores. The destiny of nations has often been stamped by the tendencies of their founders. Rome did not more completely justify her warlike inheritance in her long annals of conquest and renown than these republics their ancestry in Columbus in the daring pursuit of new discoveries which distinguish their sons. They never tire in emulating by infinitely diversified efforts that exploring spirit which spurned the trodden paths of geographic knowledge, and firmly resolved to find in an unknown and almost unimagined world the foundation of empires, the latest, if not the brightest, in that bright circle of civilization which has been expanding ever since time began.

To meet the enterprising tendencies of our people, provision is made by fundamental law for promoting the progress of science and useful arts, by securing to the ingenious for limited times the fruits of their ingenuity. The genius of our institutions does not stop there in its encouragement. It facilitates the acquisition as carefully as it provides for the existence of this stimulating security. No where are the temptations to originality so abundant or so freely brought home to the enterprising as among ourselves, whether the exuberance of encouragement be for good or evil. Legislation anxiously directed to the object is at once co-extensive with the Union, and every where uniform in its invitations through all the sovereignties of the wide spread confederacy. The judicial tribunals of the country, actuated by a corresponding sentiment, and faithfully disposed to carry out the benevolent designs expressed in the constitution and the laws, have always given the most liberal interpretation to the language of both, in favor of the inventor. All things concur in happy contribution to the mass of inducement which has not failed to produce competition which is unequalled elsewhere. It would not be fanciful to believe that this combination of natural advantages and the constitution and laws with judicial concurrence and strong public sentiment; in other words that patents and the general support of them, are among the most valuable promoters of national advancement. Some nations are stationary and have undergone little or no change in their condition for centuries. Others have degenerated and fallen lower and lower in civilization. Patents by quickening the latent energies of these stubborn races would have served to prevent their degradation if the people could have profited by the encouragement which they afford. Without such provisions we are in no similar danger. With them, under proper regulations the career of improvement is likely to be as rapid, as the subjects of improvement and protection are numerous.

A patent is obtained where it is deemed due at the smallest possible expense. If the claims to originality appear on examination to be doubtful or ill founded, the applicant is at liberty to withdraw his application, and two thirds of the very moderate fee which he has paid are

returned to him. Every opportunity is afforded for impartial scrutiny. If at last an official ordeal be passed and the inventor is fortified with the seal of government, no barrier is interposed by it to individual contest, and, it may be, to eventual overthrow. The pretensions of a holder of a formal patent are still open to free objection and defeat. A concealment of the truth as to the alleged discovery, or complicating a description with unnecessary and superfluous matter with a view to deceive, or want of originality and priority, even in actual discovery or invention; or description of it anterior to the supposed discovery of the patentee in some public work; or a prior public use or sale of it; or surreptitious or unjust practice in obtaining a patent, for that which in fact belongs to another; fair and timely notice being given of any of these allegations, will avoid the grant and cause the patent thus unworthily held, to be cancelled. While serious injury is prevented to the public by monopolies, and to individuals by interference with a lawful use of what should be open to every one; while precaution anticipates, and subsequent opportunity is afforded for correction and redress of inadvertent error; the number of patents applied for and actually obtained is large. This is to be imputed rather to the character of the people than to any undue facilities in obtaining them which are less than might at first be supposed. 1531 applications were made in the year 1847. 572 patents were issued during that period including those standing over from the previous year. Among them there is of course infinite diversity. They vary in every degree of modification from "twine stands for counters" to "cannons," from "fish hooks" to "improved steam engines." No end seems to be yet in view to the attempted perfection of these last invaluable machines. Whistles, and valves, chests, pipes, pistons and stop cocks, are thrown up by the fires of invention like pieces of matter from the entrails of a volcano. Yet fatal accidents alarm us daily in spite of hundreds of positive preventives and assured reliefs. The frequency of application and grant may be understood from the fact, that although the expenses of the office are not small and the fees charged to applicants are so inconsiderable, a surplus of fund derived from these causes amounted, on the 1st of January, 1848, to \$207,797-98.

The application of these remarks will be seen when it is understood that the Commissioner of Patents, in his last interesting report made to Congress, considers his office "as the head and representative of the inventive genius and the industrial arts of the country." Without any desire to question the justice of this claim, it may be maintained that the Institution which has brought together all these specimens of home manufactures is an efficient coadjutor. It cherishes true merit and affords early, ample and favorable opportunity for display, comparison, encouragement and correction. Having taught the elements of science, chemistry and the various departments of experimental philosophy, every thing that in the sphere necessarily allotted to it can elevate and embellish mechanic skill, it kindly interposes to restrain the exuberance of inventive genius by awakening at once keen perception and wary distrust; and it endeavors to guard against painful disappointment, as well as to foster prudent hope.

These creditable and well sustained efforts are directed immediately to the improvement of individuals who have already entered on a career of labor ; individuals, young indeed, but with habits in some degree formed by a sort of education or the want of it earlier in date than the influences of the Franklin Institute. Aptitudes even with them, may be imperfect or totally wanting, in consequence of the absence of suitable preparation at a still more flexible period of youth or boyhood. Might not the like influence be carried farther back than the age of apprenticeship to which they now extend ? Taste is a faculty of early growth. It is a faculty not only susceptible of high cultivation, but one that without cultivation has scarcely any available existence. It is acquired by opportunity and observation rather than actual study ; from models made familiar in constant intercourse rather than formal rules. Yet, when acquired, it is infused into all the exercises of mechanic industry. External proportion, symmetry and grace, can become ingredients of useful objects, as well as the sterner properties of strength and durability. To a certain degree the effect is produced already. But it may be carried still farther, and scholars may be found ripe for instruction at the loom, the anvil, and the workshop, with experienced masters, and in the lecture room and the conversation hall, with brother manufacturers and learned professors, with nothing to unlearn. The benevolence of Mr. Girard might, in aid of his clearly expressed wishes and without any change in its arrangements, furnish a nursery for this plan. The pupils of his magnificent charity will naturally be calculated for mechanical employments. It would spoil them to distort them into professional men. With an eye directed to their subsequent career, from the very beginning of their almost infant course, all the discipline they receive, might well adapt itself to the character of instruction and employment, which this institution endeavors to promote. Under judicious preparatory pupilage, the young mechanic having passed through his initiate stage, would come to his labors with double aptitude. He would be trained to master the difficulties of honorable employment, and to elevate its standard by suitable embellishment. Things useful acquire new attraction when they become beautiful. With the ancients, utility was regarded as the source of beauty. At all times, the two qualities without any interference may be profitably combined.

It is presumption in one so little skilled, to bespeak occupations or to foretel developments for those whose benevolence has made them active, and whose experience has made them wise. The merits of the Franklin Institute are written in the history of its transactions. No pledges of usefulness in the future are needed beyond those of past performance. In the vast laboratory of Nature, ingredients are deposited for the uses of yet unborn philosophy. Time, which is the great unraveller of mysteries, will at the proper moment make them known. Ages will not exhaust them. Let us hope, that when this generation shall have closed its valuable labors, successors supplied with ample materials, may be found to emulate its zeal and fidelity.

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